

Biobrick Vectors and Datasheets: A Synthetic Biology Platform for Metabolic Engineering

Taek Soon Lee*, Rachel A. Krupa, Meghdad Hajimorad, Nilu Prasad, Sung Kuk Lee, **Jay D. Keasling**

Presenting author: *Taek Soon Lee – TSLee@lbl.gov

Joint BioEnergy Institute, 5885 Hollis Avenue, Emeryville, CA 94608

Synthetic biology has been explored as a powerful tool in metabolic engineering. Standardization of biological parts is one of the most fundamental grounds to provide the foundation of designing synthetic biological systems, and there have been several attempts of establishing standard assembly strategy. For example, researchers at MIT had established BioBrickTM standard biological part strategy using XbaI and SpeI restriction enzymes and started the Registry of Standard Biological Parts. Here, using a similar strategy, we present a new standard using more robust BamHI and BglII restriction enzymes for the construction of novel plasmids with gene expression devices. We have designed and constructed 96 biobrick-compatible plasmids with a various combination of replication origin, antibiotic resistance, and transcriptional promoter. With these plasmids, we have collected protein expression data in various culture conditions using fluorescent protein as a reporter and documented them as a format of datasheet. This biobrick vector datasheet will be a useful source of information for designing and engineering metabolic pathways toward biofuel production.

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